UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,928	05/24/2001	Katsusuke Shimazaki	109431	5074

25944 7590 12/17/2003

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER	
CHEN, TIANJIE	

ART UNIT	PAPER NUMBER
2652	12

DATE MAILED: 12/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/830,928	SHIMAZAKI ET AL.	
	Examiner	Art Unit	
	Tianjie Chen	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 September 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *51-94* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *88-94* is/are allowed.

6)☒ Claim(s) *51-87* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Non-Final Rejection

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Election/Restrictions

2. Applicant's election with traverse of Species VII in Paper No. 11 filed on 09/23/2003 is acknowledged. Since all the claims have been elected, the traversal is moot.

The requirement is still deemed proper and is therefore made FINAL.

Claim Objections

3. Claim 58 is objected to because of the following informalities:

- In claim 58, line 2; "dusk" should be changed to --disk--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 67 is rejected under 35 U.S.C. 102(b) as being anticipated by Akiyama et al (JP 10-81964).

With regard to claim 67, Akiyama et al shows a disk substrate for an optical disk in Table I, the substrate having an axis of rotation and a thickness of less than

0.8 mm, wherein a disk plane tilts at a tilt angle e, which satisfies 1 mrad $\leq \theta \leq$ 20 mrad, with a plane perpendicular to the axis of rotation.

5. Claims 76, 77, 80, and 86 are rejected under 35 U.S.C. 102(n) as being anticipated by Chaya (US 5,731,929).

With regard to claim 76, Chaya a driving apparatus in Fig. 7 for driving a record disk a hub 21 which is magnetically attracted (Column 4, lines 1-7) to press the record disk, including: a driving unit 23; and a support 25 for supporting a part of the record disk to adjust the tilt of the disk to zero.

With regard to claim 77, Chaya further shows an axis of rotation and a disk plane substantially tilting with respect to a plane perpendicular to the axis of rotation.

With regard to claim 80, Chaya further shows the driving unit has a rotating shaft for rotating the record disk, and the support is formed at the top of the shaft (Fig. 7).

With regard to claim 86, Chaya further shows the rotating shaft includes a magnet 22 fitted therein for attracting the hub.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 51, 52, 54, and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abiko (JP 6-111518A) in view of Nakane et al (US 4,785,444).

With regard to claims 51 and 56, Abiko shows an optical disk in Fig. 2 for recording information thereon and reproducing the information therefrom, the optical disk being housed rotatably in a cartridge case 2 (Fig. 2): a disk substrate 4 having a hole 5 formed through the center thereof; a recording layer, which is formed on the substrate and on which the information is recorded; a hub 7 provided on the center of the substrate so as to be movable (Fig. 2: "loose fitting" in PURPOSE section in English translation) relative to the substrate; the optical disk satisfies a relationship of $Y/X \geq 0.015/$ or 0.02, where X is a projected area 6 (Fig. 2) of the substrate and Y is a contact area between the hub and the substrate.

Abiko does not show the hub having an outer diameter, which is 26% or more % of that of the optical disk.

Nakane et al shows a disk wherein the outer diameter of the hub is set as 32 mm(Column 6, lines 43-44).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to set the outer diameter of the hub being 32mm. The rationale is as follows: Nakane et al teaches that by setting the outer diameter of the hub being 32 mm, the birefrigence will be low (Column 6, lines 47-51). One of ordinary skill in the art would have been motivated to set the outer diameter of the hub as taught by Nakane et al thus reducing the birefringence. Abiko and Applicant both disclose an optical disc. Applicant's declares that a hub with an outer diameter of 31.72 mm would have ratio of 26% (Specification, p. 55, lines 13-14). In thus

constructed device, the outer diameter is 32 mm, which is greater than 31.72 mm; therefore the ration would be greater than 26%.

With regard to claim 52, Abiko shows a disc cartridge case in Fig. 4, which defines a space therein, and a size of the width of the space is 300 or more % of a thickness of the substrate.

With regard to claim 54, Abiko shows a hub 40 having a convex center portion with a side wall, the side wall having a sloping at an angle between 130 and 160 degrees at half the height of the hub.

7. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abiko in view of Nakane et al as applied to claim 51 above, and further in view of Tanaka (US 6,014,365).

With regard to claim 53, Abiko shows an optical disk as described above, but fails to show that the cartridge case has a recess and a protrusion formed on the inner surfaces thereof which face the disk, and the recess and protrusion adjust airflow in the cartridge case while the disk is rotating and are arranged to diverge away from the center of the disk at angle between 5 and 90 degrees.

Tanaka shows a cartridge case in Fig. 3, having a recess and a protrusion 15a formed on the inner surfaces thereof, which face the disk, and are arranged to diverge away from the center of the disk at angle between 5 and 90 degrees.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add the recesses and protrusions taught by Tanaka into the above device. The rationale is as follows: Tanaka teaches that by adding the protrusion, the disk is contained in the disk storing portion, with only the peripheral

edges supported and in contact with the inner surface of the cartridge body when the disk passes through the disk inlet/outlet port (Column 6, lines 23-27). One of ordinary skill in the art would have been motivated to include the protrusions to protect the disk.

8. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abiko in view of Nakane et al as applied to claim 51 above, and further in view of Yoo et al (US 6,222,812).

With regard to claim 55, Abiko does not show the optical disk but having a thickness of 0.7 mm or less.

Yoo et al shows a DVD disc wherein the substrate has a thickness of 0.6 mm, which is less than 0.7 mm.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to expect set the thickness being 0.6 mm. The rationale is as follows: Abiko discloses an optical disc. At the time the invention was made both 1.2 mm and 0.6 mm are standard thickness in industry. One of ordinary skill in the art would have been motivated to include 0.6 mm as the thickness to make the disk being able to use for the apparatus in the market.

9. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abiko in view of Nakane et al as applied to claim 56 above, and further in view of Tsai (US 6,266,298).

With regard to claim 57, Abiko shows the optical disk is used in high speed ([0003], line 8 in English translation); but does not specify the speed.

Tsai shows an optical disk apparatus, wherein the disk is rotated at a speed of 2,400 or more rpm for recordation and reproduction (Column 2, line 37-39).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to set the speed at 2400 rpm or more as taught by Tsai. The rationale is as follows: Abiko teaches that the disk is operated at high speed. Tsai shows the optical disk is commonly operated at a speed more than 2400 rpm (Column 2, lines 37-39). One of ordinary skill in the art would have been motivated to set the speed at 2400 rpm or more to operate the disk at high speed.

10. Claims 58-61, 66, 68, 69, 70, 72, and 75-79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrom et al (US 6,154,411) in view of Akiyama et al (JP 10-81964).

With regard to claims 58 and 68; Sandstrom et al shows a disk substrate in Fig. 2 for an optical disk 36 which is to be mounted on a magnetic mounting part 30 of a driving apparatus for driving the optical dusk including: and a hub 44 which is attractable by the magnetic part 58 (Column 11, lines 64-66) to press the optical disk in such manner that the disk plane becomes horizontal when the disk is mounted on the mounting part of the driving apparatus.

With regard to claim 76, Sandstrom et al shows an inherent driving apparatus for driving a record disk a hub which is magnetically attracted to press the record disk, including: a driving unit; and a support for supporting a part of the record disk to adjust the tilt of the disk.

Sandstrom et al does not explicitly show a disk plane tilting substantially with respect to a plane perpendicular to an axis of rotation of the substrate.

Akiyama et al shows a method of making an optical disk with a small warping angle of 4.1 mrad (Table 1).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to find the a disk plane tilting substantially with respect to a plane perpendicular to an axis of rotation of the substrate in Sandstrom et al's device. The rationale is as follows: it is well known in the art that every disk would have certain warping angle. Akiyama teaches a method for making small wrapping angle thus making the disk small in distortion (PROBLEM TO SOLVE SECTION, lines 1-4 in English translation). One of ordinary skill in the art would have been motivated to use this method to obtain a disk with small warping angle. As this disk is used in Abiko's device, a disk plane would have been tilting substantially with respect to a plane perpendicular to an axis of rotation of the substrate.

With regard to claim 59, Akiyama et al further shows that the substrate has a thickness of 0.6 mm (Table 1), which is less than 0.8 mm.

With regard to claim 60, Sandstrom et al further shows in Fig. 2 the disk substrate further including a cylindrical receptacle formed in a center thereof for holding the hub, the receptacle having a hole formed through the bottom thereof coaxially with the axis of rotation.

With regard to claim 61, Akiyama et al further shows that in Sandstrom et al and Akiyama et al's device, the disk plane tilts at an angle away from the bottom of the cylindrical receptacle, and the angle is 0.41 mrad, which satisfies the relationship of $1 \text{ mrad} \leq \theta \leq 20 \text{ mrad}$.

With regard to claim 62, Sandstrom further shows that the hub is held movably in the cylindrical receptacle.

With regard to claim 66, Sandstrom et al and Akiyama et al shows an optical disk, which has the disk substrate.

With regard to claim 68 and 75, the above device includes a disk having a hub that can be magnetically attracted.

With regard to claim 69, Sandstrom shows a disk with an inherent tilt angle, which is not specified, Akiyama et al shows an improved disk substrate, which has atilt angle of 4.1 mrad. Applicant recites an angle in a range between 10 and 20 mrad without specific reason for differential from the range of 1 to 20 mrad. One of ordinary skill in the art would have been find a reasonable angle through experimentations, which would include a range between 10 and 20 mrad.

With regard to claim 70, the above includes a cylindrical receptacle formed in the center thereof for holding the hub, the receptacle having a hole formed through the bottom thereof coaxially with the axis of rotation.

With regard to claim 72, Akiyama shows that the disk substrate has a thickness between 0.1 and 0.7 mm.

With regard to claims 77 and 78, Sandstrom and Akiyama et al's device includes an axis of rotation and a disk plane substantially tilting with respect to a plane perpendicular to the axis of rotation; the record disk has an axis of rotation, a thickness of less than 0.8 mm and a disk plane tilting at a tilt angle 8 with a plane perpendicular to the axis of rotation, the tilt angle 8 satisfying the relationship of 1 mrad $\leq \theta \leq$ 20 mrad.

With regard to claim 79, the above described Sandstrom and Akiyama et al's device includes an axis of rotation and a cylindrical receptacle for holding the hub, the

receptacle having a hole formed through the bottom thereof coaxially with the axis of rotation.

11. Claims 81-85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrom et al in view of Akiyama et al as applied to claim 79, further in view of Chaya.

With regard to claim 81, Chaya further shows that the driving unit has a rotating shaft for rotating the record disk, the rotating shaft has a cylindrical recess formed coaxially in the top thereof for holding the cylindrical receptacle, the rotating shaft also has a side wall defining the recess, and the support is formed at the top of the side wall.

With regard to claim 82, Chaya further shows that the rotating shaft protrudes axially from the bottom of the cylindrical recess, and the shaft includes: a first columnar protrusion having an outer diameter larger than that of the hole in the bottom of the record disk; and a second columnar protrusion protruding coaxially from the first protrusion axially of the rotating shaft.

With regard to claim 83, in above device, the disk plane tilts at an angle 8 with a direction perpendicular to the axis of rotation away from the bottom of the cylindrical receptacle, and the angle a satisfies a relationship of 1 mrad $\leq \theta \leq$ 10mrad.

With regard to claim 84, Chaya further shows that the top of the cylindrical wall defining the recess of the rotating shaft extends radially outward.

With regard to claim 85, Chaya and Akiyama further show that when the record disk is mounted on the driving apparatus, the hole of the disk engages with the second protrusion to support the disk plane of the disk on top of the horizontal

support, whereby the disk plane is kept at an angle of 10 or less mrad with a plane perpendicular to the axis of rotation of the disk.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use the shaft taught by Chaya. The rationale is as follows: Chaya teaches that his arrangement can be used to support different types of disks (Column 2, line 18-24). One of ordinary skill in the art would have been motivated to use this arrangement to support different disks.

12. Claims 62-64, 71, and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrom in view of Akiyama et al as applied to claim 61 above, and further in view of Abiko.

With regard to claims 62 and 71, Sandstrom et al does not show that the hub is held movably in the cylindrical receptacle.

Abiko shows an optical disk, wherein does not show that the hub 7 is held movably in the cylindrical receptacle.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use the movable hub taught by Abiko in Sandstrom et al's device. The rationale is as follows: Abiko teaches that installing a movable hub would avoid swaging processing and to greatly improve the reliability of a recording disk (PURPOSE section in English translation). One of ordinary skill in the art would have been motivated to use the movable hub thus improving reliability of the recording disk.

With regard to claim 63, Akiyama et al further shows that the disk substrate has a thickness of 0.6 mm (Table 1), which is between 0.1 and 0.7 mm.

With regard to claims 64 and 73, Abiko shows that a relationship of Y/X>=0.015 is satisfied, where X and Y respectively denote the projected area of the substrate and the contact area between the hub and the substrate.

13. Claims 65 and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrom in view of Akiyama et al as applied to claim 58 and 68 above, and further in view of Nakani.

In Sandstrom et al , Akiyama et al, and Nakani's combination, the hub would have an outer diameter that is 26 or more % of the outer diameter of the substrate for the reasons described above.

14. Claim 87 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaya in view of Sandstrom et al.

With regard to claim 87, Chaya shows a magnet, but fails to show it is an electromagnet.

Sandstrom et al Shows that the magnet is electromagnet (Column 11, lines 64-66).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include an electromagnet as an alternative. The rationale is as follows: Sandstrom shows the magnet can be an electromagnet, and electromagnet is also widely used in the art. One of ordinary skill in the art would have been motivated to include the electromagnet as an alternative.

Allowable Subject Matter

15. Claims 88-94 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

- With regard to claim 88, none of the prior art in the record discloses a driving apparatus for recording and reproducing information by radiating light onto the recording surface of a record disk including a light source for irradiating the record disk with light; a tilt sensor for measuring a tilt angle of the recording surface of the record disk relative to the optical axis of the light incident on the disk; a rotating shaft for rotating the record disk; an electromagnet embedded in the rotating shaft; and a controller for controlling the magnetic field intensity of the electromagnet based on the tilt angle detected by the tilt sensor, and for adjusting the force with which the hub presses the disk plane of the record disk.
- Applicant asserts that by using this arrangement, while the disk is rotated, its recording surface is kept horizontal (Spec. p. 66, lines 18-19).

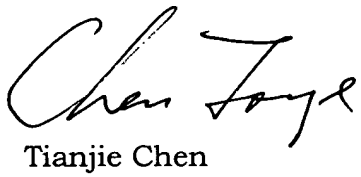
Conclusion

16. The prior art made of record in PTO 892 Form and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is (703) 305-7499. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is (703)746-6037.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.



Tianjie Chen
Primary Examiner
Art Unit 2652
12/12/2003